Stable and Dynamic Electricity Systems in the 21st Century
7 October 2014
Global Electricity Generation: a share reversal

- **Generation today:**
  - Fossil fuels: 68%
  - Renewables: 20%

- **Generation 2DS 2050:**
  - Renewables: 65%
  - Fossil fuels: 20%
Stable and Dynamic Systems

**Stable Power Systems**
- Slow demand growth*
- Little general investment needed short term

**Dynamic Power Systems**
- Dynamic demand growth*
- Large general investment needed short term

* Compound annual average growth rate 2012-20, slow <2%, dynamic ≥2%; region average used where country data unavailable

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This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Forecasting Renewable Generation

Hourly Actual vs. Forecasted Wind Generation – France, December 2011

Source: Bernard Chabot, 10 April 2013, Fig. 7 http://www.renewablesinternational.net/wind-power-statistics-by-the-hour/150/505/61845/
A Flexible System

- Dispatchable Power Plants and Forecasting
- Demand Side Response
- Energy Storage Facilities
- Integration with Adjacent Markets
Changing Role of Utilities

Emerging markets
Utility-style investments
Transmission infrastructure
Nuclear
While the majority of OECD countries have liberalised their power sectors, most emerging economies continue to regulate their electricity utilities.
Transmission and distribution costs can be deferred or, in 1 out of 3 of cases, completely avoided, by targeted energy efficiency
The 21st Century Electricity System

A sustainable electricity system is a smarter, multidirectional and integrated energy system that requires long-term planning for services delivery.